What is claimed is:

1. A flat panel display comprising:

a vacuum envelope comprising a front glass plate which is at least partly transparent and a substrate opposing said front glass plate;

a cathode formed on said substrate and having an electron-emitting source;

a gate electrode substrate having an electron-passing hole and arranged in said vacuum envelope to oppose said substrate to be separate from said cathode; and

a phosphor screen and anode electrode which are formed on a surface of said front glass plate in said vacuum envelope, wherein

said gate electrode substrate comprises at least

an insulating substrate having the electron-passing hole, and

a gate electrode formed on said insulating substrate.

2. A display according to claim 1, wherein said gate electrode substrate further comprises

an insulating layer formed on said gate electrode, and

a field control electrode formed on said insulating layer.

3. A display according to claim 2, wherein

said cathode comprises

a plurality of band-like cathodes arranged parallel to each other, and

electron-emitting sources formed on said band-like cathodes,

said gate electrode is formed on said insulating substrate in a direction perpendicular to said band-like cathodes, and

said phosphor screen is formed to have a band-like shape to correspond to said gate electrode.

4. A display according to claim 2, wherein said field control electrode covers at least said insulating layer selectively.

5. A display according to claim 2, wherein said field control electrode forms a mesh.

6. A display according to claim 1, wherein said cathode comprises

a cathode substrate having a large number of openings, and

electron-emitting sources formed of nanotube fibers formed on inner walls of the openings.

7. A display according to claim 6, wherein

said cathode substrate comprises a plurality of band-like cathode substrates which form bands and are arranged parallel to each other,

said gate electrode is formed of a plurality of band-like electrode layers arranged on said insulating substrate in a direction perpendicular to said band-like cathode substrates, and

said phosphor screen comprises a plurality of band-like phosphor screens arranged to oppose said band-like electrode layers.

8. A display according to claim 7, wherein

the flat panel display further comprises a plurality of substrate ribs vertically standing on said substrate at a predetermined interval,

said band-like cathode substrates are arranged among said substrate ribs, and

said gate electrode substrate is supported at least on said band-like cathodes and said substrate ribs.

9. A display according to claim 6, wherein said gate electrode substrate comprises a notch at part of a region thereof which intersects said band-like cathode substrates.

10. A display according to claim 6, wherein said gate electrode substrate comprises an opening portion at part of a region thereof which intersects said band-like cathode substrates.

11. A display according to claim 2, further comprising:

first driving means for applying a voltage to said anode electrode;

second driving means for applying a cathode driving voltage to a cathode;

third driving means for supplying a field control electrode driving voltage to said field control electrode;

fourth driving means for applying a gate electrode driving voltage, which forms a predetermined potential with respect to said cathode, to said gate electrode; and

control means for causing said second driving means to sequentially scan said cathode and, when said second driving means selects said cathode, driving said fourth driving means to apply, in accordance with an image to be displayed, a voltage which is positive with respect to said cathode to said corresponding gate electrode.

12. A driving circuit for a flat panel display according to claim 11, wherein said third driving means applies the voltage to said field control electrode such that a potential difference between said field control electrode and said cathode is smaller than a potential difference that generates an electric field for causing said electron-emitting source to emit electrons.

13. A method of manufacturing a flat panel display, comprising the steps of:

forming a vacuum envelope comprising a front glass plate which is at least partly transparent and a substrate opposing the front glass plate;

forming a cathode on the substrate;

forming a gate electrode substrate having an electron-passing hole in the vacuum envelope to oppose the substrate to be separate from the cathode; and

forming a phosphor screen on a surface of the front glass plate which opposes the substrate, wherein

the step of forming the cathode comprises the steps of

forming a large number of openings in one major surface of a substrate having a conductive surface, thus fabricating a cathode substrate,

forming an electron-emitting source formed of nanotube fibers on an inner wall of each of the openings, thus forming the cathode.

14. A method according to claim 13, wherein the step of forming the gate electrode substrate further comprises the steps of

forming an insulating substrate,

forming an electrode layer on the insulating substrate, and

forming the electron-passing hole and at least a notch and an opening portion in a predetermined region of the insulating substrate having the electrode layer.